# VI. Information Technology

For any information-intensive service-oriented enterprise, such as the IRS, information technology has become, and will continue to be, a key resource on which all organizational performance depends. Hardly any large-scale business can sustain itself without effective, efficient information systems. The IRS is no different, yet is faced with some truly unique, world-class challenges that it must overcome in order to fulfill its mission.

## Information technology currently in use

The IRS' installed inventory of information technology is the principal tool that IRS front-line workers and managers use to deliver services to taxpayers and to manage the organization. Nearly all IRS employees depend on the IRS computer systems every day to do their jobs, including over 70,000 individuals who use these systems to provide direct service to taxpayers. In terms of resources, the cost of IRS staff and information technology makes up nearly the entire budget, with staff costs comprising 70 percent and information technology making up 18 percent.

The IRS technology inventory is very large and diverse, comprising at present approximately 147 mainframe computers from 19 vendors, approximately 1,620 mid-range computers from 55 vendors, and over 100,000 individual computers. These computers run over 8,700 vendor-supplied software products and 82 million lines of IRS-maintained computer code. There are four major wide area data networks and 1,182 local area networks. The IRS voice network processes 182 million phone calls per year.

As in any information-intensive organization, the current IRS computer systems are a reflection and codification of IRS' established business practices and organization structure, as well as specific tax code provisions. For example, there are three different systems to support collection activities because there are three different kinds of organizational units that perform collection activities, each using particular business practices. The IRS inventory of hardware and software products is very heterogeneous, in part because each service center and region would sometimes procure different products and, even when using the same products, would use them in slightly different ways. In addition, IRS technology inventory includes many specific programs and systems that have evolved in response to specific provisions of the tax code. This process of change continues with over 800 tax code changes and many procedural changes being implemented for the FY 1999 and FY 2000 filing seasons.

The large and extremely fragmented nature of the IRS technology inventory creates many problems, including high cost and poor service to end users, high costs and long timelines to implement changes and improvements, and control and security difficulties.

## IRS core data systems are fundamentally deficient

While large in size, many of the IRS' information technology problems are similar to those of other large organizations that have installed technology piecemeal over a long period of time without a strong focus on professional management of information technology resources from the top. However, the IRS also has a very special problem that is a serious, on-going risk and a fundamental barrier to achieving its strategic goals. This problem is that the core data systems that keep records on taxpayers' tax accounts are fundamentally deficient.

The essential system on which all taxpayer accounts are maintained is called the Master File system. This system was developed in the 1960s in order to provide the first consolidated records of taxpayer accounts. It consists of a series of very large tape files, one set for individual taxpayers and another for business taxpayers. Since it is a sequential tape file it cannot be updated directly. It is updated once a week based on input from other systems, a process that takes three

days. From the Master Files tape system, some records are extracted weekly and are placed on a separate on-line system, the Integrated Data Retrieval System (IDRS), in each of 10 service centers. The IDRS system is used by most IRS customer service representatives and many other front-line employees. Dozens of other specialized systems extract and feed data back and forth through these two basic data systems.

## Some of the implications of this situation are:

- Because of the delays in updating files and the lack of synchronization of data among different systems, IRS employees frequently have inconsistent and out-of-date data about a given taxpayer. For example, if a taxpayer calls in response to a notice with a correction to his or her account, the adjustment might not take effect for up to 16 days. In the meantime, additional notices might be generated or the taxpayer might call again without the IRS employee knowing what previous adjustments were already in process.

- The Master File computer programs are written to a design and in a language seldom employed anywhere today, and which have the severe limitations of 30-year-old technology. In addition, thousands of changes to the files and the computer code have been made over the years, many of which are highly specific to particular sections of the tax code or to IRS procedures. Consequently, very few highly specialized programmers understand this system. Under these circumstances, the ability to maintain and change the system, even in response to mandatory tax law changes, is severely limited. Implementing revamped business practices, including electronic tax administration programs, is slow or even impossible.

- Because of the limitations of the core systems and the difficulty of changing them, many separate systems grew up to perform specialized functions. In addition to the problems of data synchronization, this situation leads to complex operational problems, great difficulty in making consistent changes to the system as a whole, and increases the chances of error.

- Some tax law requirements and IRS practices simply cannot be accommodated within the limits of the Master File system, leading to situations where some essential taxpayer data is not even reflected on it. For example, the RRA '98 provision for providing "innocent spouse" relief requires separating a single tax liability on a joint return for the spouses into multiple liabilities that must be tracked separately over time. As the Master Files were not designed for such situations and are limited by 30-year-old sequential file technology, it is not practical to keep such records on the Master Files. So, administration of separate files, and other programs, imposes additional costs and greatly increases the likelihood of error and delays in serving taxpayers. Several of the most severe taxpayer problem cases reported in the Senate Finance Committee hearings stemmed in part from the Master File system limitations.

- Although the Master File system holds the IRS' authoritative financial record for every taxpayer, it does not conform to accepted accounting standards. For example, a record of every transaction that affects a financial account should be maintained and be traceable to an original source entry. Amounts due for any taxpayer should be clearly identified as to the source and cause that produced the liability. The Master File system does not maintain this information because it was not designed to do so.

- In 1998, the IRS was able to provide the General Accounting Office (GAO) enough data to reliably report on the custodial activities of the agency, but GAO cited the extensive, costly and time-consuming *ad hoc* procedures needed to provide the data, and the long-term nature of the deficiencies that these procedures represented. The lack of standard accounting tools imposes ongoing costs, impedes the ability of the IRS to serve taxpayers adequately and prevents the IRS from effectively addressing material weaknesses cited by GAO.

Since nearly all IRS systems and procedures require data on taxpayer accounts, the entire IRS inventory of systems is built on a fundamentally deficient foundation. The size of this inventory and databases is comparable to the largest in the world.

Given this situation, the IRS must replace nearly its entire inventory of computer applications and convert its data on every taxpayer to new systems. This must be done in conjunction with redesigned business practices, while continuing to provide service to taxpayers and to respond to ongoing tax law and other changes. This is a vast, complex and risky undertaking that will require many years to accomplish.

# Modernizing IRS systems

It is important to understand the kind of process needed to modernize IRS' systems. This process has sometimes been compared to designing and building a new airliner or a huge office building. While there are some similarities, this comparison fails to adequately convey the nature of the IRS technology modernization program. A better metaphor would be a project to redesign and rebuild a large, densely populated city, such as New York City, complete with rebuilding all the subways, utility lines, surface transportation and tall buildings, all without delaying or injuring any residents or businesses and while accommodating ongoing growth and changes in the daily pattern of living and working. Such a program is far too big, dynamic and complex to be implemented or even designed in detail all at once.

The approach that the IRS is taking to deal with this monumental task is to establish an overall architecture for a set of new systems that will accommodate all essential tax administration functions according to modern standards of technology and financial management. Achieving this new system architecture must then be accomplished by defining a sequence of targeted and manageable size projects that meet important and specific needs while, at the same time, working to complete the overall architecture. During this process, the new and old systems must co-exist and must exchange data accurately for an extended period of time until data is gradually converted from old systems to new ones.

Given this situation, the existing inventory of installed operational systems, commonly called the "legacy systems," must not only be maintained to reflect annual tax law and other business changes, but it must also accommodate additional changes in order to bridge to and from new technology systems and convert taxpayer data from old to new formats. **Therefore, the demands on the resources and management of the legacy systems staff will increase, not decrease, for the coming years as a result of technology modernization.**

In 1997, the IRS published a "technology modernization blueprint," which described a detailed target architecture, including technical, functional and data architecture. This blueprint was an important and valuable step in the process of technology modernization.

During 1999, a principal objective was to update the blueprint to reflect the new plan for organization and business practices and, given limited capacity, to decide on the major priorities for implementation.

The speed of implementation of the technology modernization blueprint is subject to three major limiting factors:

- Capacity to design and develop new business practices and systems;
- Capacity of the organization to manage the process; and
- Capacity to make changes in the legacy systems needed to support ongoing operations and temporary integration with new systems.

Of the three factors, the capacity to manage the process and to change the legacy environment are the most constraining. Hence, planning of the technology modernization with the ongoing management of the existing environment is critical.

# Organizing to manage information technology

Because of the close inter-relationships, programs to modernize IRS technology both depend on and enable modernization of the organization and business practices. With respect to organization, there are two important dimensions: how the IRS is organized to manage information technology itself, and how the operational units that manage IRS programs work with information technology to improve business practices

and achieve our strategic goals. Improvements in both dimensions are essential in order for modernizing IRS technology to succeed.

Improvements in information technology organization are essential to achieve professional, high-quality results in resource use and in managing technology programs, including modernization of core business systems and management of the legacy systems.

Improvements in IRS business organization are essential to create business owners who have the knowledge, authority and commitment to develop improved and consistent business practices. This will also enable them to work in partnership with the information technology organization to develop and deploy appropriate technology that supports modernized business practices.

As part of the IRS overall modernization program, management of essentially all information systems resources was centralized under the Chief Information Officer in October 1998. This was a first step toward creating a professionally managed information technology organization that will provide high-quality, efficient service to all IRS operating units, treating the IRS operating units as customers.

The establishment of IRS operating divisions, as described in the previous section, will enable the appropriate business owner to revamp business practices and work with the information technology organization to modernize supporting technology.

In December 1998, the IRS awarded a PRIME contract to Computer Sciences Corporation and a team of leading technology and consulting firms to be a major partner in managing the modernization of IRS' core business and technology systems.

The modernization of IRS' core systems requires sustained leadership from the top leaders of the entire organization. To provide a framework for the overall management of this process, the IRS established in 1998 a Core Business Systems Executive Steering Committee, chaired by the Commissioner and including top executives, supported by key staff groups.

In June, 1999, Paul Cosgrave was named IRS modernization executive with overall responsibilty for manag-

ing and integrating the Core Business Systems programs. Reporting to him, the Enterprise Program Management Office was created to perform overall integration and management of all the projects in the program. The EPMO leadership includes an IRS business executive, an IRS IS executive and a PRIME executive.

Some key operating guidelines about technology modernization were also established, including the following:

• All new systems, large and small, must conform to the target architecture and system life cycle methodology. The EPMO will manage this process.

• All Core Business Systems must have committed, engaged business owners, an executive steering committee and an integrated project team. In addition, they should be designed to last a maximum of about 24 months from approval to proceed with development to initial operational deployment.

• Each project will require an approved business case before proceeding to the next phase.

• The process of developing solutions and approaches for each major project will include finding the best practices and products available from the private and public sectors as a basis for the proposed solution. Where appropriate, the PRIME will conduct a competitive process to select the best solution.

During 1999, one of the principal objectives of the Core Business Systems program was to develop a definition of and priorities for the major projects to be carried out over the next five years. This process included an analysis of projects previously proposed or in process as well as those needed to implement the revised blueprint in accord with the modernization organization and business practices described in this document. The result of this process was a decision on the high level scope and priorities of the program. This program is summarized at a high level on the next page. A more detailed description of the projects is provided in Appendix 3.

## CORE BUSINESS SYSTEMS - INITIAL PROJECTS

| PROJECT | OBJECTIVE | INITIAL RELEASE BUSINESS OWNERS |
|---|---|---|
| Customer Communications | • Improve taxpayer access to service via telephone and Internet | WAGE & INVESTMENT |
| e-Services: Near Term | • Create an integrated, Web-based replacement for the existing value-adding third-party tools and data collection vehicles | ELECTRONIC TAX ADMINISTRATION |
| Customer Account Data Engine | • Build modernized database for managing customer information | WAGE & INVESTMENT |
| Correspondence and Document on Demand Imaging | • Build systems to store and display on-line images of correspondence and selected returns | TAX EXEMPT & GOVERNMENT ENTITIES |
| CRM Collections | • Modernize collection processes and policies to enable faster case resolution | SB/SE |
| Customer Relationship Management (CRM) Exam | • Modernize examination processes, providing improved tools to agents and faster case resolution | LARGE & MID-SIZE BUSINESS |
| e-Services: Strategic | • Foster the creation & marketing of easy-to-use electronic products & services, targeted at specific customer segments, to inform, educate & service the taxpaying public – including secure electronic interactions & customer account self-management | ELECTRONIC TAX ADMINISTRATION |
| Integrated HR System: Integrated Personnel System | • Implement a single system for IRS employee data and human resource services | MANAGEMENT & FINANCE |
| Integrated Financial System: Revenue Accounting | • Improve financial management and reporting, and provide service employees with greater access to taxpayer payment data | MANAGEMENT & FINANCE |
| Integrated Financial System: Managerial Accounting/Budgeting | • Provide greater access to operational information to support timely, data-driven managerial decision-making<br>• Provide general ledger and budget execution | BUSINESS SYSTEMS MODERNIZATION |